Wall Industries, Inc.

Rev A

JC Series
2:1 Wide Input Range Single and Dual Output 2 Watt DC/DC Converter

FEATURES

- Low Cost
- 1500VDC Isolation
- Efficiency up to 81%
- Low Ripple and Noise
- MTBF > 1,000,000 Hours
- Internal SMT Construction
- UL 94V-0 Package Material
- 2:1 Wide Input Voltage Range
- Complies with EN55022 Class A
- Temperature Performance –40°C to +71°C

SPECIFICATIONS: *JC Series*

All specifications are based on 25°C, Nominal Input Voltage, and Maximum Output Current unless otherwise noted.
We reserve the right to change specifications based on technological advances.

SPECIFICATION	TEST CONDITIONS	Min	Nom	Max	Unit
INPUT (V_{in})					
Input Voltage Range	5V input models	4.5	5	9	VDC
	12V input models	9	12	18	VDC
	24V input models	18	24	36	VDC
	48V input models	36	48	75	VDC
Start Voltage	5V input models	3.5	4	4.5	VDC
	12V input models	4.5	7	9	VDC
	24V input models	8	12	18	VDC
	48V input models	16	24	36	VDC
Under Voltage Shutdown	5V input models		3.5	4	VDC
	12V input models		6.5	8.5	VDC
	24V input models		11	17	VDC
	48V input models		22	34	VDC
Input Surge Voltage (1000ms)	5V input models	-0.7		11	VDC
	12V input models	-0.7		25	VDC
	24V input models	-0.7		50	VDC
	48V input models	-0.7		100	VDC
Reverse Polarity Input Current	All models			1	A
Reflected Ripple Current			See Table		
Short Circuit Input Power	All models			1500	mW
Input Filter	All models		Pi Filter		
OUTPUT (V_o)					
Output Voltage Range			See Table		
Output Voltage Accuracy			±1.0	±2.0	%
Output Voltage Balance	Dual Output, Balanced Loads		±1.0	±2.0	%
Load Regulation	Io = 25% to 100%		±0.5	±0.75	%
Line Regulation	Vin = Min to Max		±0.3	±0.5	%
Output Power				2	W
Output Current Range			See Table		
Ripple & Noise (20MHz)			30	50	mV_{pk-pk}
Ripple & Noise (20MHz)	Over Line, Load, and Temperature			75	mV_{pk-pk}
Ripple & Noise (20MHz)				15	mVrms
Transient Recovery Time	25% Load Step Change		100	300	µs
Transient Response Deviation	25% Load Step Change		±3	±5	%
Temperature Coefficient			±0.01	±0.02	%/°C
PROTECTION					
Over Power Protection		120			%
Short Circuit Protection			Continuous		
Input Fuse Recommendation	5V input models		1000mA Slow-Blow Type		
	12V input models		500mA Slow-Blow Type		
	24V input models		250mA Slow-Blow Type		
	48V input models		120mA Slow-Blow Type		

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SPECIFICATION (CONTINUED)	TEST CONDITIONS	Min	Nom	Max	Unit
GENERAL					
Efficiency		See Table			
Switching Frequency			300		KHz
Isolation Voltage Rated	60 seconds	1500			VDC
Isolation Voltage Test	Flash Tested for 1 second	1650			VDC
Isolation Resistance	500VDC	1000			MΩ
Isolation Capacitance	100KHz, 1V		250	420	pF
Maximum Capacitive Load		See Table			
Internal Power Dissipation				1800	mW
ENVIRONMENTAL					
Operating Temperature (Ambient)		-40		+71	°C
Operating Temperature (Case)		-40		+90	°C
Storage Temperature		-40		+125	°C
Lead Temperature	1.5mm from case for 10 seconds			260	°C
Humidity				95	%
Cooling		Free air convection			
MTBF	MIL-HDBK-217F @ 25°C, Ground Benign	1,000,000 Hours			
PHYSICAL					
Weight		0.13oz (3.75 grams)			
Dimensions		24.0(L) x 13.7(W) x 8.0(H) mm			
Case Material		Non-conductive black plastic			

OUTPUT VOLTAGE / CURRENT RATING CHART

Model Number	Input Voltage	Output Voltage	Output Current		Input Current (Typ)		Reflected Ripple Current (Typ)	Efficiency (Typ)	Max Capacitive Load
			Min	Max	No Load	Max Load			
JC5S33-500	5 VDC (4.5 – 9 VDC)	3.3 VDC	125mA	500mA	40mA	471mA	100mA	70%	2200µF
JC5S5-400		5 VDC	100mA	400mA		548mA		73%	1000µF
JC5S12-167		12 VDC	42mA	167mA		534mA		75%	170µF
JC5S15-134		15 VDC	33mA	134mA		582mA		73%	110µF
JC5D5-200		±5 VDC	±50mA	±200mA		667mA		64%	470µF
JC5D12-83		±12 VDC	±21mA	±83mA		615mA		69%	100µF
JC5D15-67		±15 VDC	±17mA	±67mA		598mA		71%	47µF
JC12S33-500	12VDC (9 – 18 VDC)	3.3 VDC	125mA	500mA	20mA	184mA	25mA	73%	2200µF
JC12S5-400		5 VDC	100mA	400mA		217mA		77%	1000µF
JC12S12-167		12 VDC	42mA	167mA		209mA		80%	170µF
JC12S15-134		15 VDC	33mA	134mA		220mA		80%	110µF
JC12D5-200		±5 VDC	±50mA	±200mA		242mA		73%	470µF
JC12D12-83		±12 VDC	±21mA	±83mA		224mA		78%	100µF
JC12D15-67		±15 VDC	±17mA	±67mA		226mA		78%	47µF
JC24S33-500	24VDC (18 – 36 VDC)	3.3 VDC	125mA	500mA	10mA	96mA	15mA	72%	2200µF
JC24S5-400		5 VDC	100mA	400mA		109mA		77%	1000µF
JC24S12-167		12 VDC	42mA	167mA		109mA		80%	170µF
JC24S15-134		15 VDC	33mA	134mA		108mA		81%	110µF
JC24D5-200		±5 VDC	±50mA	±200mA		119mA		74%	470µF
JC24D12-83		±12 VDC	±21mA	±83mA		112mA		78%	100µF
JC24D15-67		±15 VDC	±17mA	±67mA		110mA		80%	47µF
JC48S33-500	48VDC (36 – 75 VDC)	3.3 VDC	125mA	500mA	8mA	49mA	10mA	71%	2200µF
JC48S5-400		5 VDC	100mA	400mA		57mA		73%	1000µF
JC48S12-167		12 VDC	42mA	167mA		53mA		79%	170µF
JC48S15-134		15 VDC	33mA	134mA		55mA		79%	110µF
JC48D5-200		±5 VDC	±50mA	±200mA		62mA		71%	470µF
JC48D12-83		±12 VDC	±21mA	±83mA		57mA		77%	100µF
JC48D15-67		±15 VDC	±17mA	±67mA		57mA		77%	47µF

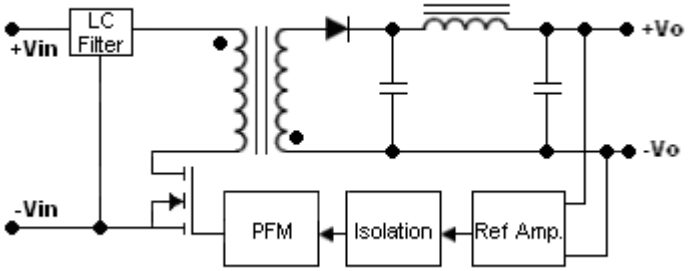
NOTES

1. Specifications typical at +25°C, resistive load, nominal input voltage, rated output current unless otherwise noted.
2. Transient Recovery Time is measured to within 1% error band for a step change in output of 75% to 100%.
3. Ripple and noise measured at 20MHz bandwidth.
4. The JC Series requires a minimum load on the output to maintain specified regulation. Operation under no-load conditions will not damage these devices, however they may not meet all listed specifications.
5. All DC/DC converters should be externally fused on the front end for protection.
6. Other input and output voltages may be available, please contact factory.

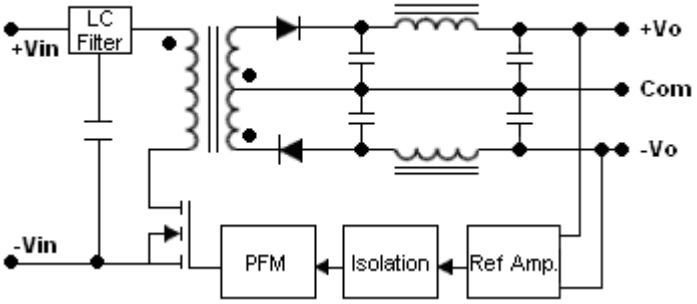
**Due to advances in technology, specifications subject to change without notice.*

BLOCK DIAGRAMS

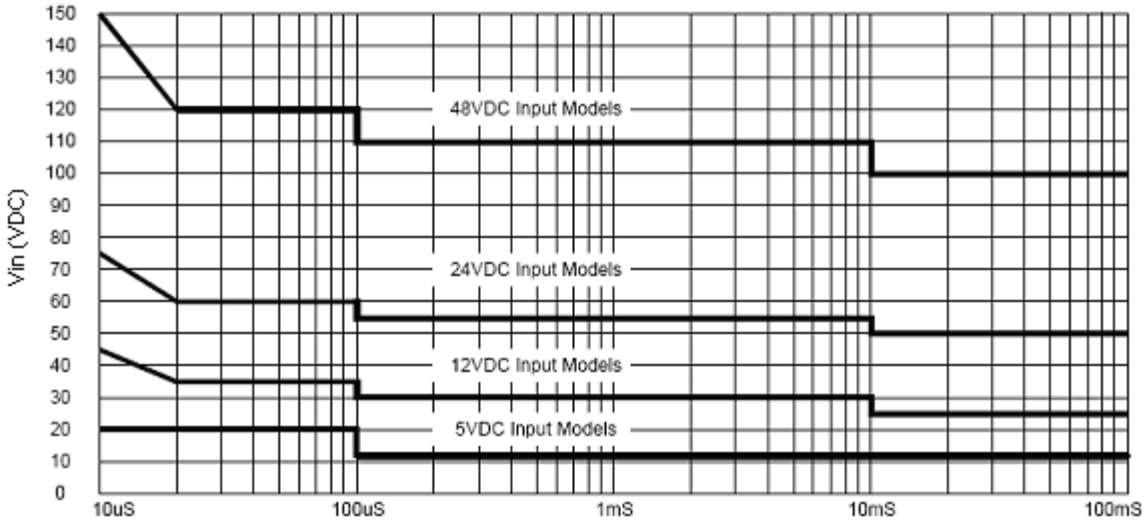
Single Output



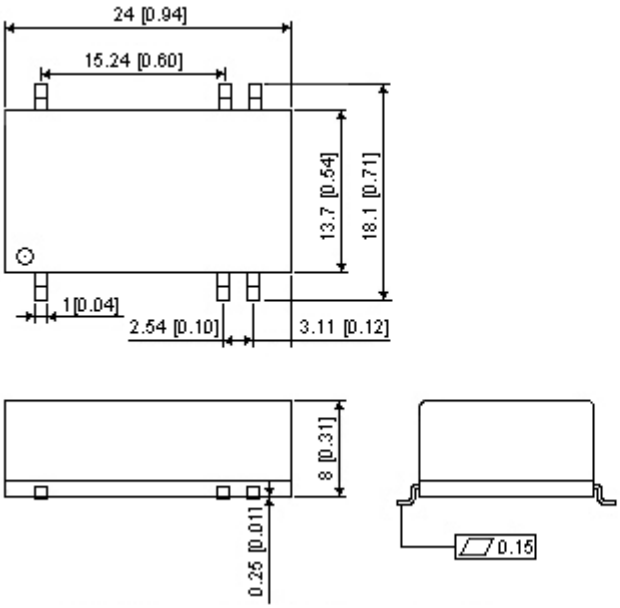
Dual Output

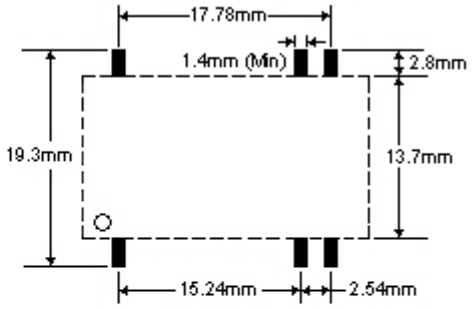


Input Voltage Transient Rating



MECHANICAL DRAWING





Tolerance:	Millimeters	Inches
	X.X±0.25	X.XX±0.01
	X.XX±0.13	X.XXX±0.005
Pin:	±0.05	±0.002

PIN CONNECTIONS		
Pin	**Single Output**	**Dual Output**
1	-Vin	-Vin
7	NC	NC
8	NC	Common
9	+Vout	+Vout
10	-Vout	-Vout
16	+Vin	+Vin

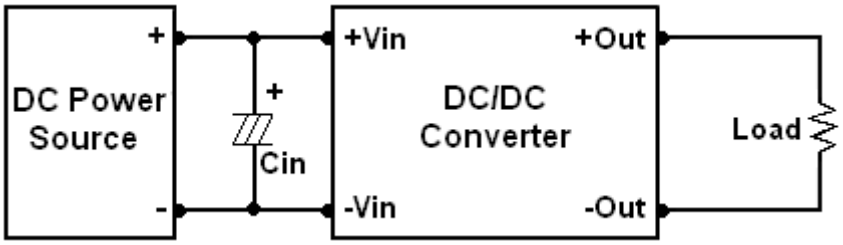
DESIGN & FEATURE CONSIDERATONS

Input Source Impedance

The power module should be connected to a low ac-impedance input source. Highly inductive source impedances can affect the stability of the power module.

In applications where power is supplied over long lines and output loading is high, it may be necessary to use a capacitor at the input to ensure startup.

By using a good quality low Equivalent Series Resistance (ESR < 1.0Ω at 100kHz) capacitor of 8.2µF for the 5V input devices, a 3.3µF for the 12V input devices, and a 1.5µF for the 24V and 48V devices. A capacitor mounted close to the power module helps ensure stability of the unit.



Maximum Capacitive Load

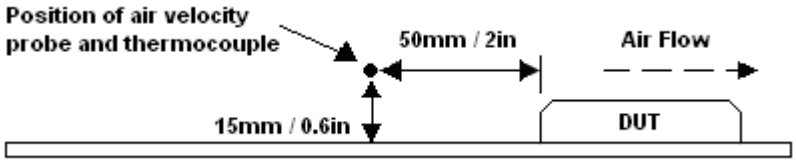
The JC Series has a limitation of maximum connected capacitance on the output. The power module may operate in current limiting mode during start-up, affecting the ramp-up and the startup time. The maximum capacitance can be found in the “Output Voltage / Current Rating Chart.”

Over Current Protection

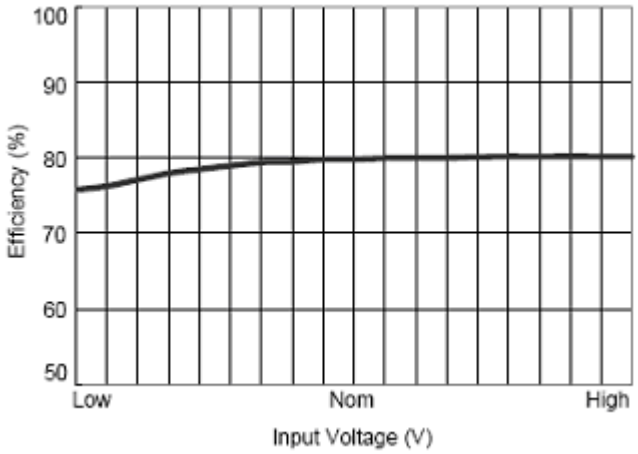
To provide protection in a fault (output overload) condition, the unit is equipped with internal current limiting circuitry and can endure current limiting for an unlimited duration. At the point of current-limit inception, the unit shifts from voltage control to current control. The unit operates normally once the output current is brought back into its specified range.

Thermal Considerations

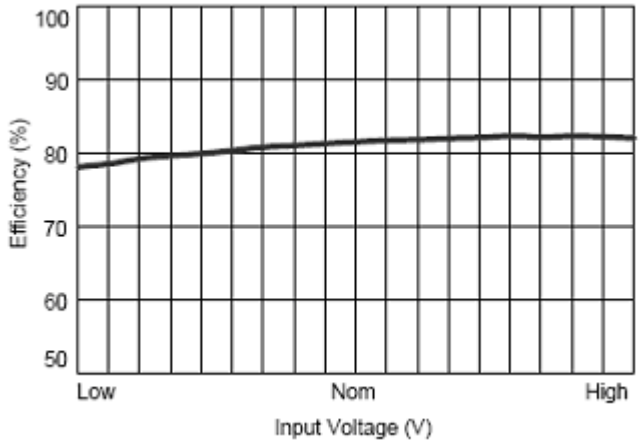
Many conditions affect the thermal performance of the power module, such as orientation, airflow over the module, and board spacing. To avoid exceeding the maximum temperature rating of the components inside the power module, the case temperature must be kept below 90°C. The derating curves are determined from measurements obtained in an experimental apparatus.



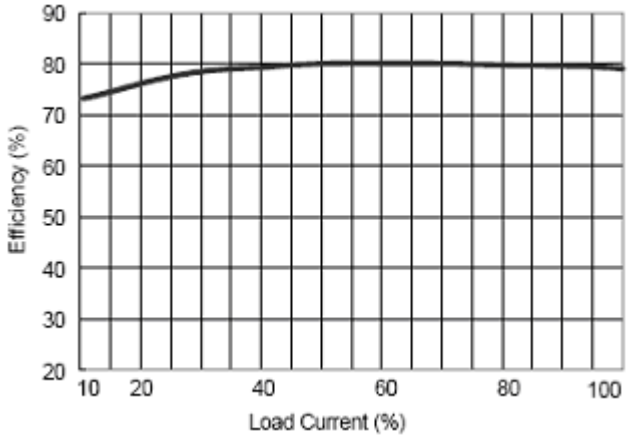
Efficiency vs Input Voltage (Single Output)



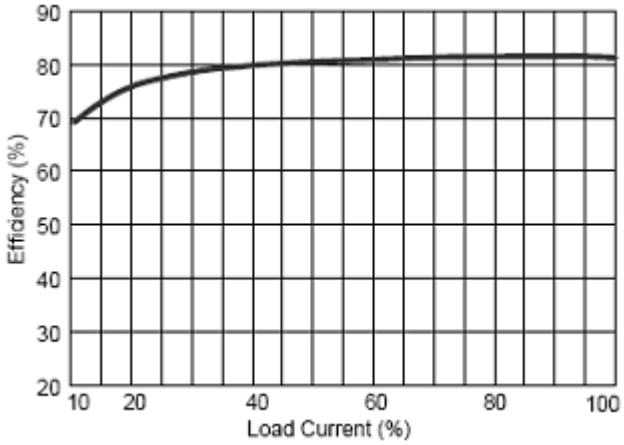
Efficiency vs Input Voltage (Dual Output)



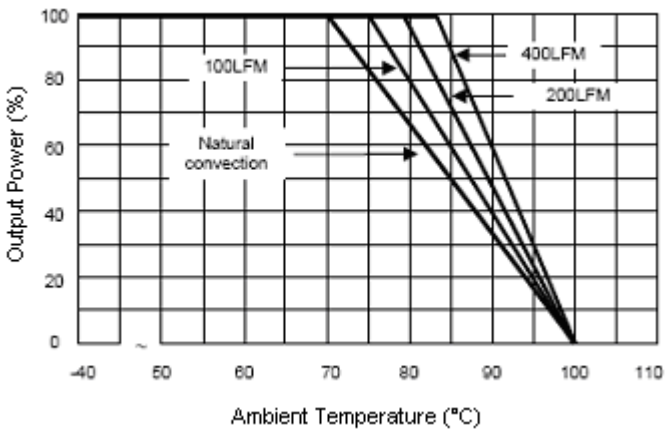
Efficiency vs Output Load (Single Output)



Efficiency vs Output Load (Dual Output)



Derating Curve



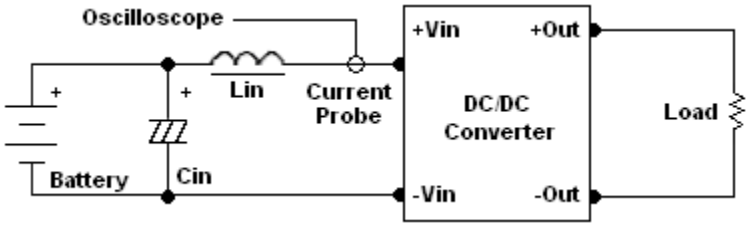
TEST CONFIGURATIONS

Input Reflected-Ripple Current Test Setup

Input reflected-ripple current is measured with an inductor Lin (4.7uH) and Cin (220uF, ESR < 1.0Ω at 100 KHz) to simulate source impedance.

Capacitor Cin offsets possible battery impedance.

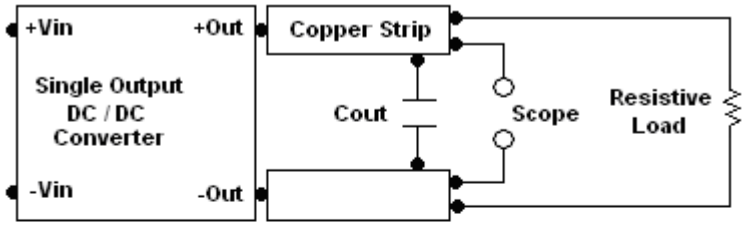
Current ripple is measured at the input terminals of the module. Measurement bandwidth is 0-500 KHz.

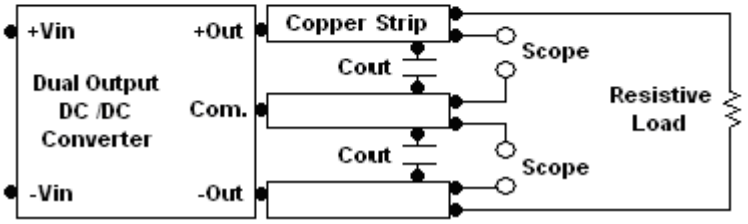


Peak-to-Peak Output Noise Measurement Test

Use a Cout 0.47uF ceramic capacitor.

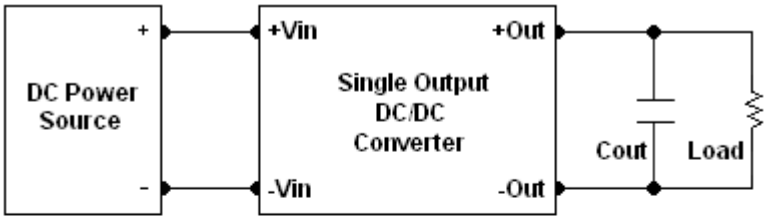
Scope measurement should be made by using a BNC socket, measurement bandwidth is 0-20MHz. Position the load between 50mm and 75mm from the DC/DC Converter.

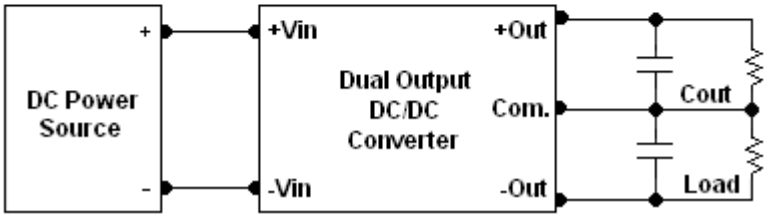




Output Ripple Reduction

A good quality low ESR capacitor placed as close as possible across the load will give the best ripple and noise performance. To reduce output ripple, it is recommended to use 3.3uF capacitors at the output.





COMPANY INFORMATION:

Wall Industries, Inc. has created custom and modified units for over 50 years. Our in-house research and development engineers will provide a solution that exceeds your performance requirements on-time and on budget. Our ISO9001: 2015 certification is just one example of our commitment to producing a high quality, well-documented product for our customers.

Our past projects demonstrate our commitment to you, our customer. Wall Industries, Inc. has a reputation for working closely with its customers to ensure each solution meets or exceeds form, fit and function requirements. We will continue to provide ongoing support for your project above and beyond the design and production phases. Give us a call today to discuss your future projects.

Contact **Wall Industries** for further information:

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